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GEOLOGICAL SURVEY

PRELIMINARY REPORT

NONACHO LAKE AREA, NORTHWEST TERRITORIES

BY

J. F. Henderson

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INTRODUCTION

Nonacho lake lies in the Northwest Territories between Great Slave lake and lake Athabaska. It is 150 miles northeast of Fort Smith and Fitzgerald on Slave river and approximately the same distance north of Goldfields, Saskatchewan. It may be reached by airplane from any one of these three air bases in a little more than one hour's flying time.

The area may also be reached by canoe from lake Athabaska or from Fitzgerald. The route[1] from lake

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[1]Camsell, Charles: "An Exploration of the Tazin and Talston Rivers, Northwest Territories"; Geol. Surv., Canada, Mem. 84, p.44 (1916).

Athabaska leaves the north shore of the lake at Camsell portage. From there a series of five portages totalling 3 miles in length leads across the height of land to Tazin lake. From Tazin lake the route is down Tazin river, through Thianka, Hill Island, and a number of other lakes to Soulier lake, and thence north by two short portages to Thekulthili river, which is ascended to Thekulthili lake. There are eight portages between Tazin and Thekulthili lakes, most of which are less than a quarter mile in length.

The route from Fitzgerald follows Leland lakes and thence northeasterly through a chain of lakes and rivers to Taltson river about 4 miles west of its junction with Tazin river. This part of the route includes about twenty long portages. From here Taltson river is ascended to Taltson lake, which necessitates about nine portages around rapids and falls.

In normal seasons aircraft on floats can operate between Nonacho lake and the air bases to the south from June 15 to October 5 and aircraft on skis from December 1 to April 15. The canoe routes are open from about June 5 to October 1.

Efficient assistance in the field work was given by A.F. Buckham, W.T. Love, F.L. Croteau, J.F. Tibbett, J.G. Sparrow, J.D. Allan, and J.H. Ross. Messrs. Buckham, Love, and Croteau were in charge of sub-parties under the writer's supervision. Thanks are due to Mr. A.L. Cumming, district agent at Fort Smith for many courtesies extended the party.

General Character of the Area

Topography and Glaciation As in other areas of the Precambrian Shield the country is flat or plain-like in appearance, presenting an even skyline to the observer when viewed from the air or from the tops of the higher hills. In detail, however, the topography is extremely rugged and harsh with rough, rocky hills rising precipitously from muskeg or lake to elevations of 200 to 300 feet.

The country is dotted with rock bound lakes connected by streams flowing in ill-defined valleys and interrupted by many falls and rapids. The character and attitude of the bedrock closely controls the position, shape, and alinement of the lakes. Areas underlain by sediments contain more and larger lakes than areas underlain by massive granitic rocks. The lake basins are alined and shaped in conformity with the strike of the bedding of the sediments or foliation of the gneisses.

For the most part the bedrock has been swept clean of overburden by glaciation, and with the exception of small swampy areas the surface is almost continuous rock outcrop. However, this is not true of the eastern part of the area where extensive deposits left by the retreating ice cover much of the bedrock. Thus along the shores and to the east of "B" lake and along Taltson river east of Nonacho lake extensive sand-plains and eskers cover large tracts of the country and conceal the bedrock. East of "D" lake, in addition to large areas of sand-plain and numerous eskers, high hills of boulder morainal deposits are also present. Outcrops of bedrock throughout this area are very scarce.

Timber, Fauna, and Inhabitants All the country is well wooded, but the trees are for the most part small and stunted. Spruce, Banksian pine, birch, and tamarack are the common species.

The lakes and streams abound in fish. The northern pike, suckers, and, in the larger lakes, trout and whitefish, are the most common varieties. The fur-bearing animals of the district include the otter, beaver, lynx, wolverine,, mink, fox, and marten. Black bears and wolves are plentiful. With the exception of moose, game is scarce in the summer. Great numbers of caribou from the barren lands to the north spend the winter within the area. In the summer of 1936 the first small herds of caribou reached Nonacho lake in the middle of August.

The Indians inhabiting the country are known as the Etheneldeli or Caribou Eaters; they are a branch of the Chipewyans. They live a roving life and make no attempt to cultivate the soil.

GENERAL GEOLOGY

Summary Statement of Formations

Late Precambrian

Basic intrusive: diabase dykes
(Intrusive contact)

"Younger" granitic intrusives: granite, granodiorite, and allied rocks.
(Intrusive contact)

Nonacho sediments: conglomerate, slate, greywacke, arkose, and quartzite
(Unconformity)

Early Precambrian

"Older" granitic intrusives: granite, granodiorite, and allied rocks.

"Older" Granitic Intrusives

The "older" granitic intrusives can be differentiated with certainty from the "younger" granitic intrusives only along and near contacts with the Nonacho sediments where the unconformable relations can be actually observed. Numerous exposures of the sediment-granite contact along the east and south shores of Thekulthili lake leave little doubt that by far the greater part of the granite east and south of the lake is older than the sediment. However, at the north end of the lake and at one locality on the east shore 20 miles south of the north end, the granite has definite intrusive relations to the sediments. The granites east of "D" lake are older than the sediments except near the southeast end where the "younger" granite is present. East of the "A" string of lakes the granites are older than the sediments, although it is probable that the "younger" granite lies not far to the east. The granites of the body to the southeast of "B" lake are for the most part probably younger than the sediments, but an older granite

was observed at the contact near the mouth of the east bay of "B" lake and southwest of "K" lake. The granites to the west of King lake are older than the sediments, but the "younger" granite comes in to the north and south of the east shore of the lake.

The "older" group of granites are, in general, light grey to pink weathering, medium-grained, granitic textured rocks with a quartz content of 15 to 30 per cent. Southeast of "B" lake, and also to the southeast of the "A" string of lakes, the prevailing type weathers a light yellowish grey, is in part gneissic, and has the composition of a granodiorite. Much of it when broken tends to fracture along surfaces coated with a dark grey to greenish chlorite which makes the rock in the hand specimen appear to have a much higher content of this mineral than is actually present. The feldspars are yellowish white to grey and generally have an altered, waxy appearance. The typical granodiorite is composed of 15 to 30 per cent quartz, 60 to 70 per cent feldspar, and 3 to 6 per cent chlorite. The feldspar in all the thin sections that were examined is predominantly albite-oligoclase with microcline and orthoclase never making up more than one-third of the feldspar present.

The "older" granitic rocks east of "D" lake and along the east and south shores of Thekulthili lake range in composition from granite to granodiorite. They are pink to light grey rocks of medium to rather coarse grain, and are characterized by a quartz content of 15 to 30 per cent. Locally they are gneissose, have a high content of chlorite, biotite, or hornblende, and contain numerous basic inclusions or schlieren of partly digested material.

Nonacho Sediments

The Nonacho sediments occur as two northeasterly trending belts. The western and smaller belt lies within the basin of King lake and Taltson river. The larger belt extends northeast from the south end of Thekulthili lake for more than 100 miles and has a maximum width of more than 20 miles. The two areas of sediments are separated and intruded by an area of "younger" granitic rocks.

Conglomerate

The conglomerate occurs near the base of the Nonacho sediments and is rarely absent where the sediments rest unconformably on the "older" granites. In general, several hundred feet of conglomerate are present. At the southeast end of Thekulthili lake conglomerates with interbedded arkose and quartzite underlie many square miles of the country where they form the gently dipping southeast limb of a large syncline. The conglomerates are here practically undeformed and dip at gentle angles to the northwest away from the "older" granite which they overlie. To the northwest of the lake the conglomerates gradually pass into the overlying arkose and quartzite by an increasing number of arkose and quartzite interbeds. The conglomerate is again exposed on the west and northwest sides of the syncline in contact with the "younger" granite. Here the beds dip at steep angles and in places are overturned. A minor anticlinal fold in the major synclinal structure is probably responsible for the exposure of the conglomerate at the surface in the centre of this synclinal structure. On the western limb of this syncline the conglomerate may be traced northeast from "G" lake to Nonacho lake. It outcrops almost

continuously along this distance except in places where it was never deposited or has been cut off by the intrusive granite. To the northeast of Nonacho lake, the conglomerate outcrops along the granite-sediment contact on the east and west limbs of the syncline at "B" lake and again on the eastern limb of another syncline to the east where it rests unconformably on the older granite.

In the King Lake synclinal sedimentary belt conglomerate outcrops on the northwest flank and again along an anticlinal fold in the centre of the basin. The conglomerate on the northwest flank of this basin rests on an "older" granite and dips at gentle angles to the southeast; the southeastern flank is cut off by the "younger" granite.

On and near Thekulthili and King lakes the greater part of the conglomerate consists of closely packed, well-rounded pebbles varying from 1 inch to 6 inches in diameter. Granite, granite-gneiss, and vein quartz make up 50 to 60 per cent of the pebbles of the conglomerate. The remaining 40 to 50 per cent are composed largely of fine- to medium-grained, grey to buff-weathering, impure quartzites with a smaller proportion of fine-grained, red to purple-weathering quartzites. The matrix is a medium to rather coarse-grained, impure arkose or arkosic quartzite that weathers to a light yellowish green colour. Sandy, crossbedded, arkosic beds and lenses from a few inches to several feet in thickness are numerous throughout the conglomerate. The lenticular and pocket shape of the sandy interbeds, the common cross-bedding, and the sudden changes in strike and dip even in the same outcrop indicate that much of the conglomerate was deposited with steep and varying initial dips.

The conglomerate occurring to the north and west of Thekulthili and King lakes is of a somewhat different type from that described above. It is characterized by the almost total absence of pebbles other than granite and allied rocks. Near the base this conglomerate consists of closely packed, angular, granite fragments from 1 to 2 feet in diameter in an arkosic matrix composed in large part of small granite fragments. Where the granite is older than the sediments the granite of the fragments near the base is in all cases similar in appearance to the granite of the basement on which it rests. In places the angularity of the fragments and the close packing make the conglomerate resemble a crushed or brecciated granite. The thickness of the basal or talus conglomerate is extremely variable even within short distances, but in places is at least 500 feet. Away from the basement the pebbles gradually become subangular to rounded and there is more variety in the types of granite of the pebbles, but few or no pebbles of rocks other than granites are present. The sorting throughout is poor and boulders up to one foot or more in size occur mixed with much smaller material. Stratification of any kind is rare up to the actual contact with the overlying quartzite or greywacke. This type of conglomerate is particularly well exposed near the mouth of the entrance to the west bay of "B" lake, on the east shore of "D" lake, and to the west and northwest of King lake. It is also present locally in the Thekulthili Lake section at the base, but in this vicinity it commonly passes within 20 feet of the basement into the conglomerate containing many pebbles of sedimentary origin, which together with the granite pebbles are well rounded.

Locally, conglomerate is entirely lacking and arkose or quartzite rest directly on the basement.

The maximum thickness of the conglomerate is difficult to estimate with accuracy until more detailed mapping is done. This is particularly true of the T Thekulthili Lake section where the dips are low, the folding is open, and the outcrop width is of no value in estimating the thickness until the structure is determined in detail. To the north, along the west shore of "B" lake the beds dip at steep to vertical angles and reconnaissance mapping gives a closer approximation of the thickness. At the mouth of the bay on the east side of "B" lake the width of the band of conglomerate is due to a close fold which results in the outcrop width being at least three times the true thickness. To the south of the bay, however, the width of outcrop represents the approximate true thickness of the conglomerate. Likewise, the conglomerate southwest of "A" lake dips at a steep angle and gives the approximate thickness of the conglomerate at that locality. It is estimated from the outcrop width of the conglomerate at these localities that the maximum thickness is approximately 2,000 to 2,500 feet. In many parts of the area it is considerably less than this and in places is entirely lacking.

Slate and Greywacke

The slates and greywackes are most widely developed in the vicinity of "G", "C", and "B" lakes. Narrow bands also outcrop along the western shores of King and "F" lakes. All these lakes owe their existance to the relatively soft, easily weathered slates and greywackes that underlie them. Considering the whole sedimentary basin as a syncline, the slates and greywackes are limited to the northwestern flank except for the narrow band to the north of Thekulthili lake.

The slates are fine grained, dark grey to black-weathering rocks. The weathered surface along the lake shores is rough, uneven, and pitted due to the weathering out of less resistant beds and lenses. Red slates, rich in hematite, were observed at one locality 12 miles south-west of the north end of "B" lake. They occur associated with red quartzites. Apart from the colour they are similar in appearance to the common black and grey slates. Much of the slate contains lenses of arkose from a fraction of an inch to 3 to 4 feet in width. Where no sandy material is present the slates are laminated, although slaty beds up to 5 and 6 feet in thickness with no laminations are not uncommon. Much material classed as greywacke is intermediate in composition and grain size between the arkose and slate. Crossbedding in the sandy lenses is common and ripple-marks are well developed, usually on the top side of sandy beds overlain by fine muds or silts. The ripple-marks are of the symmetrical type produced by wave action.

Near contacts with the intrusive granite the slates have been altered to light-coloured, silvery phyllites and fine, micaceous schists. The schists and phyllites are injected along the schistosity by many small quartz veinlets which, as the granite is approached, become pegmatitic in character.

Many quartz veins occur throughout the slates and greywackes. They are particularly abundant near the granite contact south of "C" lake. Few of the veins observed contain sulphides.

Arkose and Quartzite

Arkoses and feldspathic quartzites are the most widespread types of sediment and make up by far the greater part

of the series. They are not confined to any particular horizon but occur throughout the series, resting in places directly on the basement and also forming the topmost members.

The arkoses and quartzites are buff, yellow, and light grey-weathering rocks of medium grain. On the weathered surface the feldspar grains have a somewhat chalky appearance as compared with the glassy quartz. The beds are massive and for the most part are several feet in thickness. The bedding is very apparent where the beds are steeply inclined, but where the inclination is gentle and outcrops are low it is not easily recognized due to the thickness of the beds. Slaty, argillaceous beds from less than 1 inch to 1 foot or more in thickness occur interbedded with the massive arkose and quartzite. The arkose and quartzite contain many isolated pebbles of granite and vein quartz. These pebbles are rounded and average 1 to 2 inches in diameter, although pebbles as large as 4 inches were observed. Lenses and irregular, pocket-like masses of conglomerate are also abundant. The conglomeratic material consists of rounded granite and vein quartz pebbles in a coarser grained variety of the ordinary feldspathic quartzite or arkose. The lenses are discontinuous and pinch out within a few feet along the strike, but tend to be developed most abundantly along certain horizons in the quartzite.

Crossbedding, ripple-marks, and gradation in grain size are characteristic of the arkose and quartzite throughout. The ripple-marks are of the symmetrical type and usually occur at the top of thick, massive beds of arkose or quartzite along the contact with a thin bed of argillite. Many of the argillaceous beds show mud-cracks filled with sandy material.

Intraformational conglomerates or breccias have been developed by the breaking up and jumbling together of partly consolidated and cracked, argillaceous beds and the incorporation of the fragments in the overlying, nearly contemporaneous, sandy beds. The resulting rock is composed of sharply angular fragments and slivers of fine argillite in a sandy matrix. Intraformational conglomerates of this type were formed by wave or rapid current action after the exposure and cracking of the muddy beds.

Near contacts with the younger granite the quartzite and arkose have been baked to a fine-grained, pink rock which resembles a granite when observed at a distance. The baked quartzite is most abundant around and to the northwest of the small granite body north of "F" lake and along the granite-quartzite contact west of "J" lake. The rock weathers a bright pink as compared with the sombre buffs and greys of the unaltered quartzites and arkoses. It is cut by many quartz and pegmatitic dykes and stringers from a few inches to several feet in width, and also by many fine veinlets of quartz. The baked quartzite is brittle, and when struck with a hammer breaks into small blocks along intersecting slip or joint planes.

The arkoses and quartzites are cut by many veins of white, milky quartz which vary in width from a few inches to several feet. Few of the veins contain sulphides.

Structure

The mapping of the sediments was not done in sufficient detail to completely solve the structure, but the synclinal axes shown on the map accompanying the report indicate in a general way the major folds. In some areas, as in the vicinity of "F" lake and to the northeast of Nonacho lake, the synclinal axes are not indicated because of inadequate data.

The conglomerates, arkoses, and quartzites lie in a series of open, gently plunging folds except within the "B" and "C" Lakes synclines and along the intrusive granite contact west of "J" lake where the folding is closer and the beds in places are overturned. The distance between anticlinal crests varies considerably, but averages 4 to 5 miles. The dip of the beds on the limbs of the folds varies in general from 45 to 60 degrees, but steeper dips, up to 80 degrees, are not uncommon. Within the wide troughs of the larger synclines such as the Nonacho and "D" Lakes synclines the dips vary from almost flat to 45 degrees. The folds within the slates and greywackes, in contrast to the open folds within the arkoses and quartzites, are closely compressed. As a consequence, the crests of the folds are much more closely spaced and the prevailing dips of the beds are steep to vertical.

Relation of the Sediments to the Granites

The intrusive relation of the "younger" granite to the sediments is quite evident. Near the contact the arkose and quartzite are baked to a pink, glassy, quartzose rock, the slates and greywackes are altered to phyllites and micaceous schists, and both types of sediment are cut by many granite and pegmatite dykes.

The unconformable relations between the sediments and the "older" granite are well exposed at several localities along the east shore of Thekulthili lake. On a small island at the mouth of the large bay 8 miles south of the north end of the lake the quartzite, with a few feet of conglomerate at the base, lies unconformably on the granite. The quartzite beds strike north 20 degrees east and dip 40 to 45 degrees northwest, or away from the granite contact. Along the contact

there is a breccia conglomerate formed of angular blocks of granite up to 2 feet in diameter in an arkosic matrix. The thickness of the breccia conglomerate varies from 1 to 6 feet, depending largely on the irregular surface of the basement. The change from the breccia conglomerate to quartzite is sharp.

A good exposure of the contact may be observed on the point 12 miles south of the north end of the lake on the east shore. The older granite forming the point is overlain by conglomerate along the west shore and by quartzite along the east shore. The relations are similar to those described above. A conglomerate granite contact is well exposed 18 miles south of the north end of the lake on the west shore of the north-south trending bay. The conglomerate outcrops on the shore of the lake and on the sides of a granite hill near the lake. The best exposure of the contact is on the southeast side of the hill. The conglomerate at the contact consists of unsorted, angular, granite fragments up to 3 feet in diameter. The granite on which the conglomerate rests is in part a grey, hybrid type rich in chlorite and mica and cut by many pegmatite dykes. The granite fragments in the conglomerate are largely composed of the hybrid granite and the pegmatite dykes. The conglomerate truncates the pegmatite dykes in the granite.

The unconformity is also well exposed on the granite point on the south side of the bay leading to "K" river. Here the granite ridge forming the point is overlain by quartzite on the east and west; it was evidently a ridge or hill on the old erosion surface around which the sediments were deposited. A talus conglomerate consisting of angular

granite fragments occurs along the contact between granite and quartzite, and as irregular patches on the top of the granite hill. The thickness of the conglomeratic material varies from a few inches to several feet, although in places it is entirely absent and the quartzite rests directly on the fresh granite surface. The granite ridge forming the point is more than 200 feet high. The quartzites cover the granite to within 30 feet of the top. They are cross-bedded, contain many conglomeratic lenses, and dip away from the granite hill at angles of 10 to 25 degrees.

Other excellent exposures of the contact between the sediments and the older granite may be observed at most of the localities on the east shore of Thekulthili lake, where they are shown in contact on the map. In the northern part of the area unconformable granite-sedimentary contacts may be observed at the mouth of the creek on the east shore of "D" lake, on Talston river northeast of Nonacho lake, and on the east shore of "A" lake.

Age of the Nonacho Sediments

The Nonacho sediments are bounded on all sides by large areas of granitic rocks, and correlation with sediments of adjoining areas is, therefore, difficult. In the following table a tentative correlation is made of the formations in Nonacho Lake area with formations in Great Slave Lake area 30 miles to the north and Lake Athabaska area 60 miles to the south.

Great Slave Lake Area[1]	Athabaska Lake Area[2]	Nonacho Lake Area
Basic intrusives Sills and dykes of diabase		Basic intrusives Diabase dykes
Intrusive contact		Intrusive contact
Et-Then series Conglomerate, sandstone, quartzite	Athabaska series Basalt flows, conglomerate, arkose, sandstone, shale	
	Unconformity	
Dioritic intrusives Diorite, quartz-diorite, syenite, quartz-syenite	Granite	Granite, granodiorite, etc.
	Intrusive contact	
	Gabbro, norite, peridotite peridotite	
	Intrusive contact	
Great Slave group Conglomerate, arkose, sandstone, quartzite, shale, slate, iron formation, dolomite, limestone, breccia, basalt, andesite, trachyte, rhyolite	Beaverlodge series Quartzite, conglomerate, iron formation	Nonacho series Conglomerate, shale, arkose, quartzite
	Unconformity	
Granitic intrusives Granite, granodiorite, quartz-diorite, chloritized granite	Granitic intrusives Granite, granodiorite, quartz-syenite, pegmatite	Granitic intrusives Granite, granodiorite etc.
	Intrusive contact	
Wilson Island group Conglomerate, arkose, quartzite, phyllite, dolomite, iron formation, schist, basalt, andesite, trachyte, rhyolite	Tazin group Limestone, dolomite, quartzite, argillite, conglomerate, mica schist, gneiss; volcanic flows and fragmental rocks.	

[1] Stockwell, C.H.: Geol. Surv., Canada, Sum. Rept. 1932, Pt. C, p. 55.

[2] Alcock, F.J.: "Gold Deposits of Lake Athabaska"; Can. Min. Met. Bull. No. 292, 1936, p. 531.

The Nonacho sediments are correlated with the Beaverlodge series of lake Athabaska, which is described as consisting "dominantly of quartzites which are for the most part white but locally show various shades of grey". The Beaverlodge sediments like the Nonacho sediments rest unconformably on an older granite and are intruded by a younger granite. The Great Slave group, with which the Nonacho sediments are correlated, has been divided into a lower part consisting of several thousand feet of well-bedded and in places cross-bedded sandstones and quartzites overlaid by shales, slates, lavas, iron formation, limestone, and dolomite, and an upper part that includes limestone, shale, sandstone, and lava. Like the Nonacho sediments the Great Slave group rests unconformably on an older granite. The Nonacho sediments are probably to be correlated in age with the lower part of the Great Slave group. There is, however, a possibility that they are correlative in age with the lithologically similar Wilson Island group rather than the Great Slave group.

The Nonacho sediments were probably deposited in an intermontane basin of not much greater extent than the area now underlain by sediments. This is suggested by characteristics of the sediments that are typical of deposits of the piedmont environment, and also by the thick talus conglomerate that is present at almost all localities around the outer border of the sediments where they are in contact with the older granite. Correlation of the Nonacho series with the Beaverlodge series of lake Athabaska and the Great Slave group of the east arm of Great Slave lake does not imply that the sediments were deposited in the same sedimentary basin, and were at one time connected. It is more probable that the basins in which they were deposited were local and entirely separate from one another.

"Younger" Granitic Intrusives

As previously stated, no method is known of distinguishing the "younger" granitic intrusives from the "older", away from the actual contact with the sediments. Therefore, the description of the "older" granitic rocks applies equally well to the "younger" granites.

Thin sections of specimens of the "younger" granites that were examined show less alteration and a higher content of potash feldspar than those of the "older" granitic rocks; in other words true granites predominate over granodiorites although both types are present. However, considering the large area and the relatively few thin sections of the granitic rocks that were examined no generalization in this regard can be made until more detailed work is done in the area.

Diabase Dykes

Basic dykes, generally showing diabasic texture and ranging in composition from diorite to gabbro, cut the Nonacho sediments and granite of both ages. North of Nonacho lake they are not plentiful, and those that were observed seldom exceeded 15 feet in width. South of Nonacho lake, and in particular around and near Thekulthili lake, the dykes are more numerous and several more than 100 feet in width were observed. The prevailing strike of the larger dykes is 5 to 20 degrees west of north, but the strike of the smaller dykes is variable.

The common variety is a dark grey to greenish weathering rock, which on fresh fracture is mottled grey and black. The ophitic texture is marked in dykes of medium to rather

fine grain, but is not as apparent in those of coarser grain. Microscopic examination shows that typical specimens are composed of 50 to 75 per cent plagioclase (An 45-55) with most of the remainder augite.

Some of the diabase dykes in the southern part of the area are somewhat different in appearance from the common variety described above. The largest dyke of this type outcrops on the east shore of Thekulthili lake 16 miles from the north end. It weathers rusty brown and contains numerous yellowish grey-weathering, waxy, feldspar phenocrysts up to one-third inch in size in a fine-grained, reddish grey groundmass with poorly developed ophitic texture. In places, usually near the border, the dyke contains vesicles up to one-quarter inch in size, rimmed with altered pink feldspar and filled with calcite, fluorite, and well-formed olivine crystals. The groundmass is composed of highly altered plagioclase, chlorite, and hornblende.

The two varieties of diabase dykes were not observed in contact, but it is assumed thay they are closely related.

ECONOMIC GEOLOGY

Very little of the Nonacho area has been prospected and no deposits of economic importance have so far been found. The possibility of finding precious metals such as gold and silver is of most interest to the prospector as high cost of transportation makes deposits of the base metals of doubtful value.

Gold-bearing veins within the Precambrian Shield are believed to have formed from solutions from cooling granitic magmas. In the Nonacho area granitic rocks of two

ages are present, one of which is older and the other younger than the Nonacho sediments. The "younger" granite is the most likely source of gold-bearing veins that may occur in the area. As the "younger" granite intrudes both the "older" granite and the Nonacho sediments both the "older" granite and the sediments are possible host rocks for veins. The sediments are probably the most favourable host rocks, but the possibility of finding gold-bearing veins near the borders of the "younger" granite and within the "older" granitic rocks should not be overlooked.

In the course of field mapping one block of ground was seen that had been staked. These claims were staked by Donald and Gordon McLaren in August 1935. They are located on the east shore of Talston river 7 miles south of the narrows at the south end of King lake. A milky white quartz vein in granite outcrops about 750 feet east of the shore. The vein strikes north 35 degrees east, is 4 to 5 feet in width, and is exposed over a length of 150 feet. The vein in places is heavily mineralized with massive, fine-grained galena. Small amounts of pyrite, chalcopyrite, and arsenopyrite are also present. An assay of a grab sample from a well-mineralized part of the vein showed 0.02 ounce of gold and 1.23 ounces of silver a ton.

Quartz veins are numerous in the sediments, particularly in the northern part of the area. Few of them contain any sulphides, but this may have little significance as in the Yellowknife area to the northeast the presence or absence of sulphides bears little relation to the gold content of the quartz veins[1]. Consequently, the scarcity of sulphide mineralization within the area should not unduly discourage the

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[1] Jolliffe, F.: Geol. Surv., Canada, Preliminary Rept. 36-5, 1936.

prospector. The majority of the quartz veins that do contain sulphides occur in the sediments near contacts with the "younger" granite. The most common sulphides in the veins are pyrite, chalcopyrite, and galena. In the course of the field mapping chip or grab samples of nine veins were collected for assay. Of the nine samples, four contained only a trace or no gold or silver and the remaining five gave the following returns:

No.	Gold Oz. Troy Per ton 2,000 lbs.	Silver Oz. Troy Per ton 2,000 lbs.
1	None	1.40
2	0.12	4.40
3	0.04	0.12
5	Trace	3.62
9	0.02	1.23

Assays by Bureau of Mines, Department of Mines and Resources, Ottawa.

a.

1. Small quartz stringers in "younger" granite carrying pyrite and chalcopyrite, East shore of "B" lake.

2. From 3-inch quartz vein heavily mineralized with pyrite and chalcopyrite, cutting conglomerate on the east shore of "B" lake.

3. From 6-foot quartz vein mineralized with pyrite and and chalcopyrite, in quartzite at northeast end of "B" lake.

5. Stringers of quartz in conglomerate mineralized with pyrite and chalcopyrite on the shore of "F" lake, north of the narrows, near contact with small granite body.

9. From 4-foot quartz vein on McLaron claims on east shore of Talston river 7 miles south of King lake. Vein mineralized with galena, pyrite, chalcopyrite, and aresenopyrite.

The gold content of the samples is small, but the presence of at least some gold and silver is encouraging, and shows that some of the solutions that formed the veins throughout the country carried these precious metals.

The attention of prospectors who are considering visiting the area is drawn to the following:

(1) No part of the area has been thoroughly prospected, and most of it has not been prospected at all. It offers an almost virgin field to the prospector.

(2) Areas underlain by the Nonacho sediments are the most favourable for the occurrence of precious metal bearing veins, but the possibility of finding deposits in the "older granite and along the margins of the "younger" granite bodies should not be overlooked.

(3) The most favourable areas in the sediments are along and near contacts with the "younger" granitic rocks. Areas of sediments near small bodies of granite and about prongs or fingers of granite projecting into the sediments are worthy of thorough investigation. In particular, the prospector's attention is drawn to the following localities: (a) The sediments around and near the granite body east of "B" lake, particularly at the north end. (b) The area around the small granite body north of "F" lake. (c) The slates and greywackes around the granite prong west of Nonacho lake.